REMARKS

Claims 28 and 35 have been amended. Claims 38-41 have been added. Claims 25-28 and 35-41 are pending.

Claim 25 stands rejected under 35 U.S.C. § 112, first paragraph, based on an alleged failure to comply with the written description requirement. The Office Action asserts that the step of forming a semiconductor layer "not containing nitrogen" represents subject matter that is not described in the original disclosure. Reconsideration is respectfully requested. The original specification, e.g., states on page 90, lines 1-22 that the underlying III-V mixed crystal layer is "free from N." Withdrawal of the rejection under 35 U.S.C. § 112, first paragraph is requested.

Claims 25-28 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over U.S. Pat. No. 6,281,518 to Sato. This rejection is traversed.

Claim 25 recites a method of fabricating a compound semiconductor device. The method includes forming a first group III-V compound semiconductor layer not containing N epitaxially on a substrate. A surface of the first group III-V compound semiconductor layer is exposed to an atmosphere containing N. In addition, claim 25 recites forming a second group III-V compound semiconductor layer on the first group III-V compound semiconductor layer epitaxially. The second group III-V compound semiconductor layer contains N as a group V element. The atmosphere is substantially free from a group III element.

Sato discloses a layered semiconductor structure having an active layer made up of alternating GaInNAs layers having first and second compositions. The mono-layers are grown on a GaAs substrate by MOCVD in which the source materials (TMG, TMI, AsH_3, and DMHy) are provided in a carrier gas. See col. 2, lines 55-63. Sato offers no teaching or suggestion of a method of fabricating a compound semiconductor device in which a group III-V compound semiconductor layer not containing N is formed epitaxially on a substrate, and the surface of the layer is exposed to an atmosphere

containing N, and no Group III elements. Deficiencies in Sato being recognized, the Office Action proposes that it would have been obvious to one of skill in the art to apply a "nitrogen overpressure" in order to "prevent volatile escape and passivate the layer." Please consider, however, that the first layer recited in claim 25 contains Group III elements, and does not contain nitrogen; hence, one of skill in the art would not be motivated to expose the first layer to an atmosphere containing no Group III elements, and containing nitrogen 'to prevent volatile escape and passivate the layer.' The motivation proposed by the Office Action is lacking.

Further, according to Applicant's disclosure, exposure to a nitrogen atmosphere allows atoms to escape from the exposed layer and be replaced by nitrogen atoms, so the evidence of record contradicts the objective asserted by the Office Action of preventing volatile escape and passivating the layer. In addition, Sato discloses depositing a series of Group III-V mono-layers on the GaAs layer. Consequently, motivation to provide an atmosphere containing no Group III elements is lacking in the reference, and comes only from an improper attempt at hindsight reconstruction of the presently-claimed invention. For at least the reasons given above, claim 25, and its dependent claims 26-28 are submitted as patentable over the cited reference to Sato.

Claims 35-37 are rejected under 35 U.S.C. § 103 as being unpatentable over Sato. This rejection is traversed.

Claim 35, as amended, recites a method of fabricating a semiconductor layered structure. The structure includes a first epitaxial layer of AlGaInNP having a composition represented by $Al_{x1}Ga_{y1}In_{(1-x1-y1)}N_{z1}P_{(1-z1)}$ ($0 < x1 < 1$, $0 < y1 \leq 1$, $0 < z1 < 1$), and a pair of second epitaxial layers of AlGaInP having a composition represented as $Al_{x2}Ga_{y2}In_{(1-x2-y2)}P$. Each second epitaxial layer is disposed adjacent to and on either side of the first layer. A pair of third epitaxial layers of AlGaInP has a composition represented by compositional parameters x3 and y3 as $Al_{x3}Ga_{y3}In_{(1-x3-y3)}P$. Each third epitaxial layer is disposed between the first and second layers, and the first through

third layers maintain an epitaxy with each other. The compositional parameters are set to satisfy the relationship $0 \leq x3 < x2 \leq 1$; $0 < y3 \leq 1$. The first, second, and third epitaxial layers are formed using a metal organic compound as the source of Al.

Sato discloses a semiconductor structure in which a quantum well structure is formed of several mono-atomic layers arranged in alternating pairs, as described in Example 1 and shown in Fig. 4. Each mono-layer of the multi-layered quantum well structure contains N. The multi-layered quantum well structure is incorporated into a light emitting semiconductor device, as described in Examples 2 and 3.

Sato does not disclose or suggest a device including a first epitaxial layer of $Al_{x1}Ga_{y1}In_{(1-x1-y1)}N_{z1}P_{(1-z1)}$ ($0 < x1 < 1$, $0 < y1 \leq 1$, $0 < z1 < 1$) and second epitaxial layers of $Al_{x2}Ga_{y2}In_{(1-x2-y2)}P$ disposed on the sides of the first epitaxial layer. Fundamentally, the layers surrounding the multi-layered quantum well structure disclosed by Sato are not arranged as recited in claim 35. In addition, Sato does not disclose or suggest a device having a pair of third epitaxial layers of $Al_{x3}Ga_{y3}In_{(1-x3-y3)}P$, or second and third layers satisfying the relationship$0 \leq x3 < x2 \leq 1$; $0 < y3 \leq 1$. Consequently, Sato does not anticipate or render obvious the invention of claim 35. Claims 36 and 37 depend from claim 35 and should be allowable at least for the reasons submitted for claim 35.

New claims 38-41 have been added. Independent claim 38 recites a method of fabricating a compound semiconductor device that includes forming a first group III-V compound semiconductor layer not containing N epitaxially on a substrate, and introducing nitrogen into a surface of the first group III-V compound semiconductor layer by exposing the surface of said first group III-V compound semiconductor layer to an atmosphere containing N and substantially free from a group III element. A second group III-V compound semiconductor layer is formed on said first group III-V compound semiconductor layer epitaxially. The second group III-V compound semiconductor layer contains N as a group V element.

As noted above in connection with claim 25, Sato offers no teaching or suggestion of fabricating a compound semiconductor device in which a group III-V compound semiconductor layer not containing N is formed epitaxially on a substrate. Further, Sato does not teach or suggest introducing nitrogen into the surface of the first group III-V compound semiconductor layer by exposing the surface of the layer to an atmosphere containing N and no Group III elements. New claim 38, and its dependent claims 39-41 are submitted as patentable over the cited reference to Sato.

Allowance of the application is solicited.

Dated: August 30, 2004

Respectfully submitted,

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